July 23, 1940. H. P. TRUESDELL 2,209,242

ELECTRICAL CONNECTOR

Filed Jan. 26, 1938

Fig. 1.

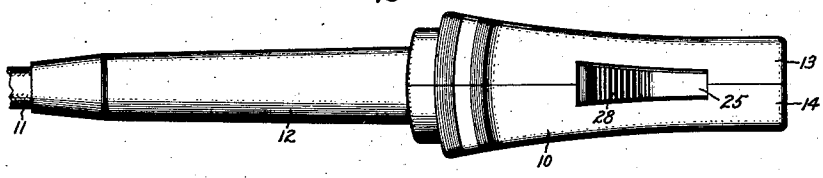


Fig. 2.

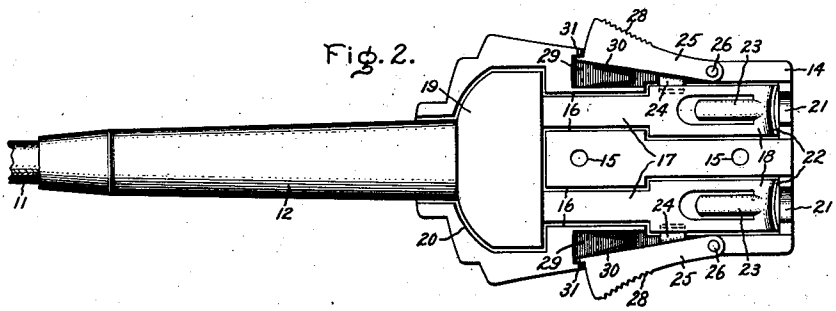


Fig. 3.

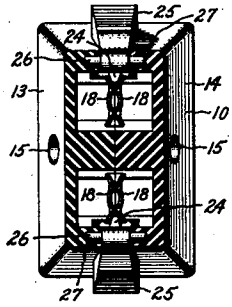


Fig. 4.

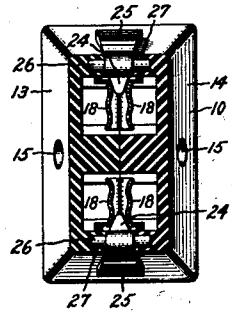
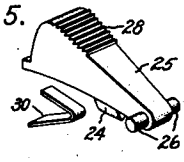


Fig. 5.



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2,209,242

ELECTRICAL CONNECTOR

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Application January 26, 1938, Serial No. 187,046

4 Claims. (Cl. 173—332)

This invention relates to electrical connectors for attachment to an electrical appliance or the like, and more particularly to electrical connectors having spring contact clips adapted to receive the prong connectors of an electrical appliance.

In order to secure a good electrical contact between the spring blades and prong connectors, it is necessary that the spring blades be formed of relatively heavy material which, while being flexible, must retain sufficient strength to clamp the prong connectors firmly and securely. Under these conditions it is somewhat difficult to insert the prong connectors between the contact blades because it is necessary to "spring" or separate the blades by means of the prong whenever the prong connectors are to be inserted.

It is an object of this invention to provide auxiliary opening means for "springing" or "separating" the contact blades prior to insertion of the prong connectors so that the prong connectors may be easily and quickly inserted between the contact blades; thereafter the auxiliary means is released to permit the contact blades to grip the connector prongs.

In the accompanying drawing Fig. 1 is a view in elevation showing a connector incorporating the separating means; Fig. 2 is a plan view of the device with one-half of the connector casing removed; Fig. 3 is a sectional view through the connector showing the spring blades in normal retracted position; Fig. 4 is a similar view showing the spring blades in expanded or separated position, and Fig. 5 is a perspective view of the blade separating means.

Referring to the drawing, a connector plug is shown at 10 connected to a conductor 11 by means of a strain relief sleeve 12 employed as a means to protect the connection between the cord and the connector plug. The housing of the connector is formed of two parts, 13 and 14, which are held together by any suitable means such as bolts (not shown) passing through openings 15. The two portions 13 and 14 are identical in structure and the lower portion only will be described with particular references to Fig. 2.

The lower base portion 14 is formed of suitable insulating material, such as a phenolic condensation product and filler, and is provided with a plurality of recesses 16 which are adapted to receive the contacts 17. The contacts 17 are formed of two opposed spring members 18 secured together by any suitable means, such as welding, and are embedded in a strain relief plug 19 of insulating material which is mounted in a recess 20 joining the recesses 16. The conductors of the cord are connected to the respective contacts 17 within the interior of the strain relief plug 19. The strain relief plug prevents withdrawal of the cord and contacts from the base of the connector and being integral with the sleeve 12 forms a rigid structure which protects the connection between the conductors and spring contacts.

In order to provide for insertion of the connector posts or prongs of an electrical appliance, openings 21 are formed in the end wall of the base merging with the recesses 16 to receive the prongs of an appliance connector (not shown). The blades 18 are flared at 22 to facilitate entry of the connector posts and are provided with tongues 23 to grip the posts closely. The contact blades 18 of the contacts are formed of heavy phosphor bronze and are normally in the retracted position shown by Fig. 3.

It is difficult to apply the contact blades to the connector prongs of an appliance when the blades are in normally closed or retracted position because of the strength of the contact blades which resist separation by the prongs as the connector is pushed down upon the connector prongs. Accordingly, it is desirable to provide a means to open or separate the contact blades prior to insertion of the prong connectors so that the prong connectors may be easily and readily insertable between the contact blades without the necessity of exerting considerable force to open the blades. Such a provision is particularly desirable when applying the connector to an electrical appliance such as an iron or toaster which may have become heated in use and which cannot readily be grasped by the hand for forceful application of the connector.

To this end, a means to separate the blades is provided in the form of wedge-shaped elements 24 which are adapted to be inserted between both pairs of contact blades 18. The wedge-shaped elements 24 are operated by means of handles 25 disposed on each side of the housing, the handles being pivoted to the housing by means of pivot pins 26 received in the bearing recesses 27. The handles 25 are formed of composition similar to that of the housing and are knurled, as shown at 28, to provide a gripping surface for the fingers of the operator. The pivot pins 26 and the wedge-shaped elements 24 may be formed of composition integrally with the operating handles or may be formed of metal and inserted in the handles. While the element 24 has been defined as "wedge-shaped" it should be

understood that this term is intended to cover other operative forms of the element, for example, a conical form. The operating handles move in recesses 29 formed on each side of the base member and a U-shaped spring 30 is placed in each of the recesses 29 to maintain the operating handles in extended position with the wedge-shaped elements 24 retracted from between the spring blades. A projection 31 formed on each of the handles cooperates with a wall of the recess and retains the handles within the recesses thereby limiting the outward movement of the handles under the influence of the springs 30.

It will be apparent that the operating handles 24 may be easily grasped at the knurled portions 28 and forced toward each other to insert the wedge-shaped elements between the contact blades thereby expanding the blades to a position such as shown by Fig. 4 so that the prong connectors of an appliance may be easily inserted between the contact blades. Thereafter the handles are released to permit the contact blades to grip the connectors. By providing the operating handles upon each side of the housing of the connector, as shown by Figs. 1 and 2, the handles are located in a position where they are easily grasped by the fingers as the connector is applied to the appliance.

While I have shown a spring 30 to maintain the wedge-shaped elements in retracted position, it should be understood that in some circumstances this spring may be omitted in which case the resiliency of the contact blades will act upon the wedge-shaped members to force them and the operating handles to retracted position permitting the spring blades to close. The various elements of the connector may be assembled upon the lower part of the housing, as shown by Fig. 2, and the upper part may then be applied over the lower part securely clamping the contact blades, operating handles and strain relief plug in position.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In an electrical connector, a housing of insulating material, a spring contact member comprising opposed flexible spring blades mounted in said housing and adapted to receive a prong connector, a manually movable element pivoted in said housing and having a portion extending beyond the confines thereof, a wedge-shaped projection on said element insertable between said blades to separate said blades for ready insertion of said prong, and spring means within said housing and engaging said element normally to hold said projection in withdrawn position.

2. In a plug connector, a housing of insulating material, a manually movable element pivoted within said housing and having a portion projecting from the confines of said housing, a contact member having opposed flexible blades mounted within said housing and adapted to receive a prong connector, said blades being spring biased toward each other to grip the prong connector, and a wedge-shaped element connected to said manually movable element and insertable between said blades to separate them against the action of said spring bias for ready insertion of said prong connector.

3. In an electrical connector, a housing of insulating material having recesses therein, contact members comprising opposed spring blades disposed in said recesses, a second pair of recesses disposed on each side of said housing, manually operable elements pivoted to said housing and disposed in said second mentioned recesses, a wedge-shaped member mounted on each of said elements and insertable between said contact blades to separate said blades for ready insertion of a plug connector, and spring means disposed in said second mentioned recesses to retain said wedge-shaped members in retracted position.

4. An electrical connector comprising a housing of insulating material having recesses therein, a plurality of contacts mounted in some of said recesses, each contact comprising a pair of opposed spring blades adapted to receive a plug connector, and means including a wedge-shaped element mounted in other of said recesses and being insertable between the pairs of blades of each contact member for separating said blades to permit ready insertion of a plug connector, said means having a portion extending beyond the confines of the housing for manual operation thereof.

HENRY P. TRUESDELL.